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CONFIDENTIAL

REPORT

of

The Infantry Board

No. 1717

ROCKET, 2.36", HC, T27E1

FORT BENNING, GEORGIA

16 November 1944

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VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

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U.S. ARMY SAVE CONSERVATION PROGRAM

OFFICE OF

IB-471.94

THE INFANTRY BOARD

FORT BENNING, GEORGIA

16 NOV 1944

SUBJECT: Rocket, 2.36", HC, T27E1.

TO: Chief of Ground Requirements Section, Headquarters, Army Ground Forces, Army War College, Washington, D. C.

1. Authority. The test of the subject rocket, which is covered in detail in the attached Record of Test, was directed by 2nd Indorsement, Headquarters, Army Ground Forces, 1 September 1944, to President, Infantry Board, file 471.94 (C) (23 Aug 44) GNRQT-11/96353.

2. Description of Material. The Rocket, 2.36", HC, T27E1 is a chemical filled head and adapter, fitted to the mortar tube and tail assembly of the standard Rocket, 2.36", M6A3 or M7A3. The mortar tube assembly of the subject rocket is interchangeable with other 2.36" rockets. The head is 5" long and weighs 1.68 pounds. The complete round is 16" long and weighs 3.44 pounds. (Figures 1 and 2, Record of Test, and Test No. 1)

3. Purpose of Test. The tests were designed to obtain specific data on the following:

a. Ballistics.

b. Reliability of the fuze assembly.

c. Effect of smoke-producing characteristics as compared with the Rocket, 2.36", WP.

d. Casualty-producing effect as compared with the Rocket, 2.36", WP and HE.

e. Volume, character and duration of the smoke cloud.

4. Facts disclosed by the tests.

a. The subject rocket produces a heavy volume of smoke. Production takes place from 5 to 7 seconds after impact and continues for approximately 1 minute and 7 seconds. (Test No. 2)

b. The casualty producing effect of the subject rocket is negligible as compared to the Rocket, 2.36", WP or HE. (Test No. 3)

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c. The ballistics of the subject rocket are approximately equal to those of the Rocket, 2.36", WP and HE. Both subject rocket an d the WP rocket are slightly more stable in flight than the Rocket, 2.36", M6A3. (Test No. 4)

d. The fuze of the subject rocket is adequately reliable and is sufficiently sensitive to function on loose sand or soft ground or at comparatively flat angles of impact. (Test No. 5)

e. The volume of smoke produced by the subject rocket is greater and longer lasting than that produced by the WP rocket. However, the force of the jet of smoke causes the cloud to form above the ground, thus failing to screen ground level targets. The WP rocket is superior for placing instantaneous smoke on a small area or point target as delivery is produced on impact.

5. Discussion. The advantage that the subject T27E1 Rocket has over the WP Rocket is that the smoke delivered is of greater volume and of longer duration. However, the WP Rocket is entirely satisfactory for small Infantry unit use and, in addition to being an effective incendiary and casualty producer, is capable of producing a satisfactory smoke screen which can be maintained at the desired intensity by occasional thickening rounds. The WP Rocket is superior for small area or point targets when instantaneous smoke is desired. By increasing the number of rounds fired the WP Rocket can duplicate the effect of the T27E1 Rocket, whereas the HC Smoke cannot duplicate the effect of white phosphorus.

6. Conclusions. The Infantry Board concludes:

a. That there is no requirement for more than one type of 2.36" smoke rocket.

b. That the subject T27E1 Rocket is inferior to the WP Rocket for Infantry use and that further development thereof should be terminated.

7. Recommendation. The Infantry Board recommends:

That the Rocket, 2.36", HC, T27E1 be considered unnecessary and unsuitable for Infantry use.

For the President:

P. E. LEIBER,
Colonel, Infantry,
Acting Director.

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RECORD of TEST

ON

ROCKET, 2.36", HC, T27E1

TEST SECTION
THE INFANTRY BOARD

FORT BENNING, GEORGIA

TO: THE DIRECTOR, THE INFANTRY BOARD.
HEREWITH DETAILED RECORD OF TESTS
RELATING TO THE ABOVE PROJECT.

William P O'Neal Jr.
WILLIAM P. O'NEAL, Jr.,
Major, Infantry,
CHIEF, TEST SECTION

8 Copies.

Copy No. 1 Date 30 October 1944

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TEST SECTION
THE INFANTRY BOARD
FORT BENNING, GEORGIA

30 OCTOBER 1944

SUBJECT: RECORD OF TEST OF ROCKET, 2.36", HC, T27E1

TO: THE PRESIDENT, THE INFANTRY BOARD, FORT BENNING, GEORGIA

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Paragraph No.	Subject	Page No.
1.	AUTHORITY AND REFERENCE	10
1a.	Directive Letters	10
1b.	References	10
2.	INTRODUCTORY INFORMATION	10
3.	PURPOSE OF TEST	11
4.	DETAILS OF TESTS AND RESULTS	12
	Test No. 1: Determining the physical characteristics of the T27E1	12
	Test No. 2: Determining the nature of the smoke screen produced by the T27E1	15
	Test No. 3: Determining the casualty-producing effect of the T27E1 as compared to the WP and H.E. rockets	16
	Test No. 4: Determining the relative ballistics of the T27E1, the M6A3, and the WP rocket	17
	Test No. 5: Determining the reliability of the T27E1 fuze assembly	18
	Test No. 6: Determining the comparative value of HC and WP rockets for producing smoke screens	19
5.	SUMMARY OF FACTS	20
APPENDIX		
"A"	Memorandum, The Infantry Board, IB-471.94, 9 October 1944	21
"B"	Letter, Office of The Chief of Ordnance, O.O. 471/3670 (C), 23 August 1944, with 2 Indorsements	22

DECLASSIFIED
Authority NND 735022
By NAKA Date DEC 22

1. Authority and References:

a. Authority:

(1) Memorandum, The Infantry Board, IB-471.94, 9 October 1944. (Appendix "A")

(2) Letter, Office of The Chief of Ordnance, O.O. 471/3670 (C), 23 August 1944, with 2 Indorsements. (Appendix "B")

b. References:

(1) Infantry Board Report No. 1651.

(2) Infantry Board Report No. 1693.

2. Introductory Information.

a. The Rocket, 2.36", H.C., T27E1, hereinafter for the purpose of this report to be called the T27E1, is a chemical filled head and adapter fitted to the motor tube and tail assembly of the standard rocket M6A3 or M7A3.

b. H.C. as a smoke producing agent is a recognized army chemical in use in a number of grenades, pots, shells and candles. The use of the 2.36" Rocket motor to project chemical heads has been used with the Rocket, 2.36" (WP) T26E1 and T26E2 (See I.B. Report No. 1651) and with the Rocket, 2.36", Incendiary, T31 (I.B. Report No. 1693). The Rocket, 2.36", (WP) T26E2 was tested and proved an excellent Infantry munition. One of the factors in favor of this rocket was its employment as a smoke producing screening agent. However, white phosphorus, because of its rapid and violent reaction when exposed to air, is not as efficient as HC for many types of smoke screens.

DECLASSIFIED
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3. Purpose of Tests.

To determine:

a. The physical characteristics of the T27E1.

b. The nature of the smoke produced by the T27E1.

c. The casualty-producing effect of the T27E1 as compared to that of the WP and H.E. rockets.

d. The relative ballistics of the T27E1, the M2A3 and the WP rocket.

e. The reliability of the T27E1 fuze assembly.

f. The comparative value of the HC and WP rockets for producing smoke screens.

DECLASSIFIED
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By NARA Date 9/22/22

4. Details of Tests and Results.

Test No. 1.

a. Purpose: To determine the physical characteristics of the T27E1.

b. Method: By weighing, measuring and studying the subject rocket.

c. Results:

(1) The T27E1 rocket is composed of the M6A3 or M7A3 motor tube assembly and the chemical filled head, which is a metal container for the HC mixture and the starting mixture. This head is provided with four fiber covered blowout holes (See Figure 1) in its base to permit the easy exit of the smoke when the burning starts. No detonator is needed or provided since this head burns and does not explode.

(2) The head is 5 inches long and weighs 1.68 pounds. Figure 2 shows the disassembled rocket.

(3) The motor tube assembly is interchangeable with that of other 2.36" rockets and is 11-3/16" long and weighs 1.76 pounds.

(4) The assembled rocket is 16" long and weighs 3.44 pounds.

(5) The shortness of this rocket as compared to an M6A3 (19.2") is due to the absence of the empty ogive of the H.E. rocket since no standoff is necessary with a chemical head of this type.

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Base of HC rocket head.

Note: Four holes to permit smoke to escape when burning starts.

Figure 1

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Motor tube assembly, washer and head of HC Rocket, T27E1.

Figure 2

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Test No. 2.

a. Purpose: To determine the nature of the smoke screen produced by the T27E1.

b. Method: By observation of the smoke throughout the firing tests and by timing the length of burning and smoke production.

c. Results:

(1) The T27E1 produces a smoke which is gray, as it emits from the rocket head, but looks white as it thins out.

(2) The smoke is forced out by the pressure generated as the HC burns and turns to gas. Because the smoke is coming out under pressure, it forms a solid jet for a short distance from the base of the rocket head and then this jet breaks up and spreads out to form a cloud.

(3) The rockets burned for approximately 1 minute and 7 seconds, from impact to cessation of burning.

(4) Smoke does not appear in any appreciable quantity for approximately 5 to 7 seconds after impact. From the first slow, thin smoke the quantity gradually increases until the forceful jet mentioned above is reached. The smoke then does not diminish until the end of burning.

(5) Wind conditions govern the duration and the value of the smoke screen. Therefore, no general statement can be made which will apply to all conditions of wind and weather. However, as stated above the rockets average about one minute of smoke and if the wind is not blowing the smoke away from the object or area to be screened, a cloud of at least one minute duration is provided.

(6) Under good conditions one rocket screened a front of fifty yards for two minutes.

(7) Also under good conditions four rockets screened an area 100 yards square.

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Test No. 3

a. Purpose: To determine the casualty-producing effect of the T27E1 as compared to the WP and H.E. rockets.

b. Method: By firing the three types of rockets into prepared silhouette areas and by observing the effects of the HC on personnel throughout the test period.

c. Results:

(1) The casualty-producing effects of the HC are negligible when compared to WP or H.E. Short of a direct hit or a dense concentration of smoke where personnel are unable to move away, the H.C. has no noticeable effect on personnel.

(2) An HC rocket in a pill-box, a bunker, a house or other confined space will choke and gag a man and cause him to cough and require fresh air. However, a WP or H.E. rocket in the same confined space would produce more positive results.

(3) HC as a chemical agent has always been considered only a mildly toxic smoke whose employment was for screening purposes and not for anti-personnel use.

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Test No. 4

a. Purpose: To determine the relative ballistics of the T27E1, the M6A3, and the WP rocket.

b. Method: All three types of rockets were fired from fixed mounts at short, medium and long ranges and shot groups were checked.

c. Results:

(1) The T27E1 can be fired interchangeably with the M6A3 and the WP rockets.

(2) The flight of the T27E1 at long ranges, like that of the WP rocket, is slightly better than the flight of the M6A3. Both chemical rockets seem to oscillate less than the H.E. does.

(3) Some erratic rounds were present in the flight of each type of rocket. This, however, was not predominant in any one type of rocket.

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Test No. 5

a. Purpose: To determine the reliability of the T27E1 fuze assembly.

b. Method: By observation of the functioning of the rockets throughout the period of the test firing.

c. Results:

(1) No malfunctions occurred due to fuze failures except at extremely flat angles where both the M6A3 and WP rockets also failed to function.

(2) The fuze of the T27E1 is sufficiently sensitive and reliable to function on loose sand, soft ground or at comparatively flat angles of impact.

(3) The fuze of this rocket is reliable and is as sensitive as is consistent with safety for handling when using the safety features in this present type of fuze assembly.

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Test No. 6

a. Purpose: To determine the comparative value of HC and WP rockets for producing smoke screens.

b. Method: The WP rocket and the T27E1 were fired at the same targets from the same ranges and under identical weather conditions.

c. Results:

(1) The T27E1 produced a longer-lasting and larger cloud of smoke than did the WP rocket.

(2) For a long-lasting screen a gunner, taking wind into consideration, could lay down a timed barrage of T27E1's and successfully keep an a rea smoked.

(3) Smoking a small point target with the T27E1 was difficult under many conditions. When used against the aperture of a pill box for example, the T27E1 had to strike an exact point in order to cover the aperture. Due to the intense jet of smoke which issues from the rocket, the smoke screen is formed a short distance above the ground. Thus, a very heavy screen may blow above the small target at ground level without obscuring that spot.

(4) The WP rocket surpasses the HC rocket for placing instantaneous smoke on a small area or point target. The WP rocket bursts on impact and produces smoke instantly.

(5) For use against an aperture, or against any small ground-level target, the WP is again better than the T27E1. Because the WP head bursts and spreads flaming particles in all directions, smoke on the ground is provided.

(6) A number of WP rockets can be fired to duplicate the long-lasting large volume of smoke of the T27E1, but the T27E1 cannot be used successfully on many targets which require instantaneous smoke on a point, or small area.

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5. Summary of Facts Determined by Tests.

a. The motor tube assembly of the T27E1 is interchangeable with that of other 2.36" rockets. The head is 5" long and weighs 1.68 pounds. The complete rocket is 16" long and weighs 3.44 pounds. (See Test No. 1)

b. The smoke of the HC rocket is gray as it jets out of the rocket, but it looks white as it thins out. Approximately 1 minute and 7 seconds of burning and smoke production takes place after impact. A large volume of smoke is produced in this period of burning.

c. The casualty-producing effects of the T27E1, are negligible when compared to the WP and H.E. rockets. Except for a direct hit or burning in confined place very little anti-personnel effect may be expected. (See Test No. 3)

d. The ballistics of the T27E1 are comparable to those of the WP and H.E. rockets. The T27E1 and the WP rockets are slightly more stable in flight than is the M6A3. (See Test No. 4)

e. The functioning of the fuze of the T27E1 was reliable throughout all firing tests except for flat angles. At flat angles, however, the T27E1 functioned as well as the M6A3 or WP rockets. (See Test No. 5)

f. The T27E1, because of its greater volume of smoke and the longer-lasting screen it produces, is superior to the WP rocket for some types of area screens. However, the WP rocket is better for small area or point targets or when instantaneous smoke is desired. By increasing the number of rockets fired WP can duplicate the HC smoke screen, whereas the HC cannot duplicate the effects of WP on some types of targets. (See Test No. 6)

Kenneth D Sheldon
KENNETH D. SHELDON,
Captain, Infantry,
Test Officer.

I concur in the above report:

William P O'Neal Jr.
WILLIAM P. O'NEAL, JR.,
Major, Infantry,
Chief of Test Section.